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7.1.5 Floor Coverings

Floor coverings emcompass an enormous range of materials, including textiles, hard surface materials, and resilient materials. Floor coverings must be able to withstand varying amounts of foot and wheel traffic without premature degradation. The conventional criteria for floor-covering material selection include wear resistance, slip resistance, noise control, and aesthetics. Environmental considerations for floor coverings include the resource efficiency of the source materials, the additives used to install and finish them, their impact on indoor air quality, and their potential for disposal or recycling at the end of their useful life. Floor coverings can be integral to the building floor structure, mechanically fastened, or chemically bonded.

Opportunities

Depending upon the ease of removal, durability, amount of traffic, and changes in space usage, opportunities for replacing floor coverings can occur relatively often during the life cycle of a building. Even when replacement is not an option, careful cleaning and maintenance can increase longevity and reduce possible health hazards related to flooring.

Technical Information

Carpet is the most common floor covering in office settings, and its environmental implications include the use of resources, maintenance practices, and indoor air quality (IAQ). The odor of new carpet is a by-product of the styrene butadiene latex (4-PC) commonly used to adhere face fibers to backing materials and the adhesives used to install carpets. In recent years, latex manufacturers and the carpet industry have significantly reduced 4-PC and other VOC emissions from carpeting. Look for carpet, cushions, and adhesives that carry the Carpet & Rug Institute's (CRI's) green IAQ label, ensuring a low-emitting product. Carpets that cover large interior surfaces also provide "sinks" for the absorption of VOCs from other sources.

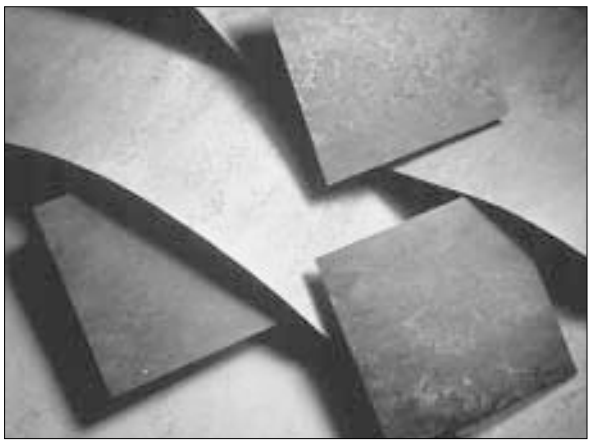
Odors, as well as dust and allergens, can be minimized with regular vacuuming and extraction cleaning. CRI identifies vacuum cleaners that have been tested for soil removal and dust containment with the green IAQ label; using these vacuum cleaners regularly provides a cleaner indoor environment.

The EPA's guideline for purchasing polyester carpet for light- and moderate-wear uses is 100% polyethylene terephthalate (PET) from recycled plastic soda bottles. In addition, nylon carpets are available with 25% recycled nylon fibers. Recycled content is also available in backing materials. Several companies make carpet cushions of recycled and natural materials such as recycled post-industrial fibers, recycled polyurethane, jute, and hair.

> ☑ Many carpet manufacturers participate in programs that collect used carpet for recycling into new carpet and other products. When specifying carpet for a new facility, give preference to manufacturers that guarantee they will help recycle the carpet later on.

For glue-down installations, use adhesives and seam sealers with the lowest possible VOC levels. Alternatives to glue-down include carpet tiles with peel-and-stick backings or mechanical fasteners using hook-and-loop tape (Velcro™). In residential and hospitality settings, installation using tackless strips at the perimeter is common. Carpet tiles can be replaced when soiled or damaged. Fusion-bonded carpets use heat instead of adhesives to bond the face fiber to the primary backing, which reduces VOCs.

Minimize the risk of indoor air quality problems by installing carpet in accordance with CRI guidelines (CR-104). These guidelines instruct installers to make sure that fresh or forced air is circulating during installations and for a few hours afterward to protect highly sensitive people in the area. Some managers require suppliers to unroll and air out carpets in the warehouse before bringing them into the building. Carpets should never be installed where moisture and organic matter can contaminate them.



Source: Forbo Industries

First manufactured in the 1860s, linoleum is a natural material made primarily from linseed oil, pine rosin, sawdust, cork dust, limestone, and jute. Today's products come in many colors and patterns for creative flooring options.

Carpet mats are especially appropriate outside entrances, to catch dirt and moisture from outside. Mats should be cleaned or exchanged regularly.

Carpet that has become wet should not be allowed to remain that way for long; it should either be dried completely or removed. Although carpet is not a food source for biological organisms, mildew and mold can grow in the moist, soiled areas.

☑ Install walk-off mats and/or grates at all entries with heavy traffic. Mats or grates greatly reduce the amount of sand, grit, and hydrocarbon pollutants tracked into the building. Reducing sand and grit will increase the longevity of all floor coverings and increase cleaning intervals. Reducing tracked-in contaminants also improves indoor air quality.

Some manufacturers provide extended services for installation, maintenance, and removal. For a monthly fee, the manufacturer takes responsibility for maintenance and replacement as needed. Leased carpet can have the lowest first-cost and may be the most likely to be recycled.

Resilient flooring includes vinyl, linoleum, rubber, and cork. These are available in rolls or tiles and require adhesives for installation. They are typically composites with several layers: facing, body, and backing. Linoleum is made from renewable, nontoxic materials. The linoleic acid from the flax seed oxidizes gradually over a long period of time. This oxidation helps prevent microbial growth and makes the material harder over time. It also releases a natural VOC that some people find objectionable at high concentrations. Linoleum also has naturally occurring antistatic properties, making it good for rooms with sensitive electronic equipment. Rubber flooring can have a high recycled content, although some recycled rubber products may offgas VOCs. Cork is an excellent sound-absorbing material and is recyclable. Adhesives for each product must be specifically formulated for the flooring material substrate being installed.

Cementitious materials provide opportunities for integrating the floor finish with the building structure. They provide durability, low maintenance, and an opportunity to use recycled materials, as in terrazzo-type finishes.

Ceramic tile can be made from recycled glass or recycled mine tailings. Glazes are typically energy-intensive and produce pollutants in their manufacture. Thin-set mortar and grout for tile installation often contain latex additives,which increase the flexibility and durability of the installation but also offgas VOCs.

Natural stone such as slate, granite, and marble from regional sources can help create a sense of place and save transportation costs. Cementitious mortars and grouts reduce the VOCs associated with other types of flooring.

Source: Interface

Solenium carpet tiles from Interface are a sandwich of very different materials designed to come apart for recycling.

Wood floors provide the environmental benefits of a renewable and long-lasting material, and they can be disassembled and reused or recycled at the end of their useful life. (See *Section 7.1.3* for environmentally preferable wood choices.) Wood flooring requires periodic refinishing, however, which can be a source of VOC emissions. Laminates minimize the use of nonrenewable resources by bonding a thin, resilient surface onto a strong, high-density fiberboard made of recycled wood.

References

GreenSpec: The Environmental Building News Product Directory and Guideline Specifications, BuildingGreen, Inc., Brattleboro, VT, 1999; (800) 861-0954; www.greenspec.com.

Demkin, Joseph, AIA, ed., *Environmental Resource Guide*, John Wiley & Sons, New York, NY, 1999.

"Aberdeen/Green Seal Environmental Standard for Certification of Commercial Adhesives," Green Seal, Inc., Washington, DC; (202) 872-6400, (202) 872-4324 (fax); www.greenseal.org.

CRI Indoor Air Quality Testing Program, for carpet, cushion, floor-covering adhesives, and vacuum cleaners; for information, call (800) 882-8846.

CRI-104, Standard for Installation of Commercial Carpet, available from the Carpet & Rug Institute.

Contacts

The Carpet & Rug Institute, P.O. Box 2048, Dalton, GA 30722; (800) 882-8846, (706) 278-8835 (fax); www.carpet-rug.com.